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10th floor Thompson Hall
University of Massachusetts
Amherst, MA, 01003-7510
Telephone: (413) 545-6355
Facsimile: (413) 545-2921
Email:peri@econs.umass.edu
Website:
http://www.umass.edu/peri/

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Abstract: For the rural poor – who depend above all the land for their survival – a central development challenge is to sustain a base of natural capital that can support a robust local economy. In India, government mismanagement of forests, grazing lands, and water resources has often alienated rural people and exacerbated resource degradation. This paper shows the potential to reverse these trends when local people gain control over natural resources and manage them through systems of participatory democracy. Four case studies from semi-arid, hilly regions of India illustrate how democratic control of natural assets can lay the basis for ecological restoration and sustainable livelihoods.

Introduction

In many parts of the developing world, poverty is not so much about a lack of money but about a lack of natural resources. The majority of people live off the land, and prosperity means plenty of water, crops, animals, and timber. For the rural poor, improving the *gross nature product* is far more important than increasing the *gross national product* (Agarwal 1985). The challenge is to build a base of natural capital that can support a robust local economy.

A rural village is a tiny ecosystem, held in fine balance. Such finely tuned systems are fragile, however, and easily damaged. Of some four billion people living in 114 developing countries, more than 2.5 billion live in rural areas, and of these approximately one billion are poor, according to the International Fund for Agricultural Development. Less than half the rural population has access to safe drinking water, and even less have irrigation water to sustain agriculture. Almost a third of the people in the developing world have a life expectancy of just 40 years (IFAD 1992).

In its 1992 report, *State of World Rural Poverty,* IFAD notes that while several developing countries have made progress in reducing the percentage of people in poverty, the absolute number of rural poor has increased. The report concludes that the "trickle-down" approach has not worked, or at least it has not worked enough.

This paper presents four case studies from India in which rural communities succeeded in mobilizing natural and human capital to vastly improve their circumstances. These cases speak to the enormous potential for generating economic wealth and well-being through proper management of natural resources. It is remarkable how quickly a destitute, ecologically devastated village can transform into a green and prosperous one, especially in regions where a large share of natural resources are held as common property.

The studies all come from the hill and plateau regions of India, with climates that are semi-arid to sub-humid (500 mm to 1,250 mm of rainfall per year). In all cases, a significant share of resources is held in common. From the colonial era until recently, however, they were managed by government agencies. Over time, local communities became alienated from these resources, and the government failed to manage them well. As a result, they suffered all the indignities of open-access property regimes outlined in Garrett Hardin's tragedy of the commons.

In these regions, water harvesting and integrated land-water management are critical issues that require joint solutions above the level of the individual forum. These issues are not new to India or to many other parts of the developing world. The art and science of 'collecting water where it

falls' is an ancient but 'dying wisdom' which needs to be revived to meet modern freshwater needs adequately, equitably, and sustainably, and needs to be modernised with inputs from science and technology.

Water harvesting means capturing the rain where it falls, or capturing the run-off in one's own village or town. This can be achieved in a variety of ways: by capturing runoff from rooftops; by capturing runoff from local catchments through the construction of small check dams; by capturing seasonal floodwaters from local streams and retaining them in small reservoirs; or by conserving water through watershed management, so as to reduce runoff losses. Local level cooperation is often critical to success, since check dams, reservoirs, and watershed management cannot be accomplished by individuals acting in isolation.

In each of the case studies, communities have succeeded in restoring the environment because they have been able to gain significant control over natural resources and to manage them through a system of local, participatory democracy. As natural capital began to grow, so did community spirit, and villagers saw that they had a great stake in managing their assets wisely. Such grassroots involvement is critical to a sustainable economy.

I. Principles for Rebuilding Natural Assets

A Holistic Approach

Resource management must be comprehensive, taking into account all the resources of a village: grazing lands, tree and forest lands, croplands, water systems, and domestic animals. Often rural development efforts falter because they are fragmented. A government agency that builds ponds and tanks, for instance, will fail to consider whether land-use practices in the village protect the catchment of these tanks. Likewise, agencies that look after animal husbandry and promote dairy operations often pay little attention to increasing fodder supply.

Environmental management will succeed at the local level only if the community is mobilized and given power. Environments vary enormously from one settlement to another, and a central organization cannot be sensitive to the variations. Though migration to towns has eroded villagers' interest in their immediate environment to some degree, they are still more familiar than anyone with their own environment and with the social and political dynamics of their community. Government agencies can help, particularly by setting up a legal framework for local control.

Each village must come up with its own plan, one which addresses not only the nature of local resources, but also the interests of various socio-economic groups and the interplay of private and common property. Productivity of private resources often depends on the productivity of commonly held ones. While a watershed may be held in common, for example, the water

harvested from it will affect the yield of private crop lands. Similarly, grass from a common pasture helps sustain private animals.

A restoration program should set in motion a series of benefits that unfold over the years. In the cases studied in this paper, the first step usually is water conservation, which provides for more irrigation water, which in turn makes more grass grow, which provides more feed for animals. Gradually, fodder production increases, as do timber resources from the tree and forest lands.

Property Rights

Ecogeneration depends on laws that give the community the right to improve its common natural resources. Many political reformers have focused on reform of private land ownership, working to redistribute property from rich to poor. Such land reform is an important strategy in places where most of the land is privately held and many people are landless, as in the floodplains of the Ganges Valley. In other places, however, a large share of the land is held in common, usually under state ownership. Such is the case in the hill, mountain, arid and semi-arid regions of India. There the main task is to reform the control and management of common land. This may require legislation that divests government agencies of control, even if they continue to own the property.

As a rule in India, inequality tends to increase as we move from the hills and mountains to the plains, from non-irrigated areas to irrigated ones, and from arid regions to humid ones. In the places where water is relatively abundant, most land is privatized, and the ownership is highly concentrated. In general, the more equal societies are the ones that depend more on common lands than on private property. The cases in this paper all come from the less divided regions of the county, where common property is the main target for reform.

Without direct control over common property, no village can really take care of it. In India, where the government owns most of the common resources, villages have lost interest in environmental protection, leading to massive abuse of forests, grazing lands, and local water systems. The case studies in this paper are testimony to the potential to reverse such neglect when people are given a stake in the benefits of proper management and are encouraged to take the initiative.

Institutions for Democracy

Participatory democracy is critical for ecological regeneration. Environmental management requires cooperation and discipline. Villagers have to refrain from grazing their animals in the protected commons. They must conserve the catchments of their local water bodies. They must distribute produce from common lands equitably. Villagers can achieve all this only if they have local institutions that promote equity and unity. The whole community will work together only if everyone stands to benefit. With strong local leadership and suitable institutions, rural communities have shown that they can unite to manage their resources.

In India, the best model for a village institution is the Gandhian concept of a *gram sabha,* an assembly of all adults in the village. Through a *gram sabha,* every family can have a say in decisions. In settings where ownership of resources is highly concentrated, participatory democracy helps to ease the inequity. Such is the case in the humid plains, where most of the natural resources have been privatized, so that a few own most of the land, while most own nothing. The idea that government bureaucracies can mediate between the powerful and the poor at the village level has proved to be a chimera. The powerful have always co-opted the bureaucracies.

Public forums work much better than elected village councils. Public assemblies take place in open view, introducing accountability and confidence in decisions. Decisions by a small coterie of leaders, even if elected, rarely engenders trust and cooperation among the less powerful members of the community.

Where more than one village shares a common resource, such as a forest, stream, or watershed, the settlements need an additional institution to make joint decisions. Several village watershed committees may need to come together into a common river parliament to manage a stream flowing through their communities.

So far, India lacks a legal framework to give *gram sabhas* the power that they need. In India, non-governmental groups pressured the national government in the early 1990s to provide a strong role for *gram sabhas* in its *Panchayati Raj Act,* a bill to strengthen decentralised systems of governance. But the advocates did not prevail, and the law that passed fails to promote participatory democracy.

The law provides for elected councils, or *gram panchayats,* to represent clusters of villages. The *panchayats* have authority to implement schemes for rural development. The law requires regular elections and reserves seats for certain groups. It also mandates a finance commission to oversee the council's spending.

The flaws in the legislation are many. While the people elect their representatives, the state legislatures actually retain power over the *panchayats* and have the authority to dissolve them. This arrangement sets the stage for political patronage and sycophants rather than public accountability.

The representative government instituted by the legislation is a weak form of democracy. Firstly, *panchayats* are the products of village factionalism, accentuated by electoral politics and generally dominated by the more powerful in the village. Secondly, panchayats are just too far removed from the grassroots to be effective agents for natural resource management. A *panchayat* usually covers several villages. On average, there are about three villages per *panchayat*, but in some areas there are many more. In the eastern state of Assam, for instance,

there are 29 villages on average per *panchayat*, and in Orissa and West Bengal there are about 11.

The *panchayat* meets as a closed forum and so is not truly accountable to the villagers. Closed meetings set the stage for corruption by village leaders, petty bureaucrats and politicians. *Panchayat* leaders, in league with local officials, can easily siphon off most of the benefits of programs. In most cases, villagers are not even aware of the projects that the government has approved.

The *panchayats* have taken an active role in rural development in many states. But because they fail to genuinely represent the interests of the community at large, their role in resource management is marginal and in most cases destructive. As a result, non-governmental groups invariably bypass the *panchayats* altogether to do their work and instead create new village forums allowing open deliberations. Even where governments have been the prime actor in rural regeneration, they have found it more effective to create new village institutions than to work with the *panchayats.* The state government of Madhya Pradesh has simply excluded the *panchayats* from its land and water management programs and has instead given power and funding to the informal village assemblies.

In response to public pressure, the *Panchayati Raj Act* established the *gram sabha* as an entity. But the law leaves it to state legislatures to define the *gram sabha's* powers. *Gram sabhas* have been able to thrive in some areas even in the absence of such legally defined powers. However, national legislation to strengthen the village assembly is critical to promoting natural resource management throughout the country.

Funding

Poor communities need financial assistance to get started in rebuilding natural capital. Funds from the state or some other source can be critical in mobilizing villagers to invest time and energy in developing a plan for resource management. The community must have control over the funds.

Even a small pool of funds can often be quite effective, mobilizing villagers to contribute their own free labor and resources to the community and creating an upward spiral. As the village starts to build its common natural assets, the commons will support economic growth throughout the community by supplying food, fuel, fodder, raw materials for artisans, and other resources. Over time, the village itself often can raise substantial sums of money to invest in its land and water systems.

II. Four Case Studies of Ecological Revival

Following are four case studies of rural villages in India that have transformed themselves from ecological poverty to sustainable economic wealth. Most people in the areas studied have small patches of land and are poor. All depend on common lands for their survival. Such villages present an advantage for reviving the economy, in that the villagers have an immediate stake in cooperation.

The first case is that of Sukhomajri, a village in the sub-Himalayan range in north India. The second is Ralegan Siddhi, a village in the state of Maharashtra. The reform initiatives in these two villages are now more than 20 years old, offering a view of how natural assets can build over time. The third study, from the dry and hilly Alwar region of Rajasthan state, follows changes which began more than 12 years ago.

In these three cases, the impetus for reform came from outside the government. The experiments received much attention, but sceptics dismissed them as extraordinary successes that could not be widely replicated. Then, in 1996, the state of Madhya Pradesh initiated a statewide program for watershed development based on the model of Ralegan Siddhi. This fourth case shows that with enough political will, ecological regeneration can be widespread.

The studies demonstrate that ecorestoration is possible even in highly degraded lands, reviving the local economy and alleviating poverty. These successes have depended on both good technology and good politics, that is, community involvement and control.

In all of these cases, communities pressed for rights over state-owned property. As the common resources became more productive, so did private ones. Improved management of the common watershed led to increased irrigation and thus a better yield from private farmlands. Revived forests yielded more fodder, and thus better results from private livestock.

Case 1: Holistic Watershed Management in Sukhomajri

The hamlet of Sukhomajri was once like any other village in the foothills of the Shivalik Mountains: sparsely vegetated, with poor farm land, and a great deal of soil erosion and runoff. As crop yields were uncertain, villagers traditionally kept herds of livestock as a safeguard. Open grazing by the livestock kept the surrounding hills and watersheds bare.

The Shivaliks are naturally susceptible to erosion, but their condition deteriorated rapidly after the British took control of the region in the 19th century and began heavy logging in the area. Forests soon gave way to clay-covered banks and boulders in the upper catchments of the rivers (Franda 1981).

The British recognized the danger of erosion and in 1902 passed the Land Preservation Act, which closed some lands to grazing and provided for various soil conservation measures, such as contour bunds, gully plugs and tree planting. But the erosion continued apace because people had no alternative but to graze their animals on these lands. The colonial government made no

attempt to involve people in the management of these lands, and invariably intruded into the traditional land use systems. This resulted in the total alienation and opposition to the conservation measures being taken by the foreign government. Unfortunately, the independent Indian state has continued with these policies. In 1976, the National Commission on Agriculture, alarmed by the situation, again recommended soil conservation measures. But the people were determined to let their animals graze, and again the conservation efforts failed.

By the 1970s, the man-made Sukhna Lake, surrounded by the Shivalik Mountains, was filling up with silt. Sediment was pouring into the lake from the denuded forest lands around it. The lake was the main water supply for the city of Chandigarh, the joint capital of Haryana and Punjab**.** City officials became alarmed and considered digging a new lake. They asked for a study from the government's Central Soil and Water Conservation Research and Training Institute. Researchers at the institute found that the vast majority of the erosion was from a higher catchment area and was concentrated in pockets of severe erosion, including the little village of Sukhomajri, 15 kilometers upstream from Sukhna lake. The hills there were cut into pieces by tall, bare, vertical walls. The researchers realized that Sukhomajri was their starting point for saving the lake.

Ecological poverty in Sukhomajri

The research team arrived in Sukhomajri to find a settlement of just 59 families, mostly poor shepherds with small, drought-stricken plots of land to farm. The village was homogeneous in terms of caste. Thirty-seven families owned less than one hectare, and 20 families owned one to two hectares. (A hectare is 2.47 acres.) Only two families owned more land (Mishra 1980). All together, individuals owned a little more than half of the land, and nearly half was *panchayat* land, or community land. Over the years, villagers had encroached on the community land to cultivate it.

The village had no source of irrigation. The annual rainfall of 1,137 mm came almost entirely during the four monsoon months. Because their land was sparse and not very productive, the villagers were steadily forced to cultivate inferior wastelands. They had begun to plant even on steep slopes, exposing the land to further erosion. In 1968, several acres of land had plunged 13 to 15 meters into a gorge at one end of the village, and since then the precipice of the gorge had been moving closer to the village, destroying more cultivated fields each year. Meager crop yields forced the villagers to keep a large number of goats and other animals to supplement incomes. The village faced an acute shortage of fodder and in most years had to import wheat straw from other villages.

The institute team tried to implement soil and conservation measures in the village, but residents resisted. One villager told P.R. Mishra, the institute director, "The people of Chandigarh are very rich. We will continue to send mud and they will continue to remove it. We are poor and have no other way to survive but to graze our animals and get some milk" (Agarwal and Narain 1990).

So villagers continued to take their animals to graze in the watershed. Residents destroyed soil conservation structures, breaking check dams and brushwood dams. They took the piles of logs and twigs used for the brushwood dams home to burn. For a time, the conservation team doggedly continued work, planting trees and building more check dams along with staggered contour trenches and grade stabilizers. But the people continued to undermine the efforts.

Water is the starting point

Then came a turning point. In 1976, institute scientists built a small earthen dam to stem erosion by diverting water into a reservoir. The following year, the rains failed and the wheat crop was withering. Villagers asked the scientists if they might use water from the reservoir. With the stored water, they were able to save crops close to the dam site.

Villagers and scientists alike saw the potential of the dam. Daulat Ram, an enterprising villager, showed the institute staff another good site for a dam, this time an irrigation dam and not just a soil conservation structure. A second dam was built in early 1978 with support from the Ford Foundation. An underground pipeline was laid to take water to the fields, and undulating terrain was levelled in order to maximize the benefits from irrigation. Farmers willingly shared the cost of levelling with the agency. One farmer sold two goats on the spot to pay for the work.

Still, the water did not get to everyone. Only half the village was prospering. The arable land in the village was divided into two parts by the village road, and the water conveyance system benefited only the land on one side. A few farmers started to irrigate water-intensive crops like paddy and sugarcane, even though the project was supposed to provide only modest, supplemental irrigation. Furthermore, the water was distributed through a government official who had started taking bribes.

The village became divided. Resentful villagers without access to the water kept grazing in the watershed, continuing to undermine efforts to stop erosion. When Madhu Sarin, a social worker employed by the Ford Foundation, asked the women about the benefits of the dam water, one responded bluntly, “What water? We do not get any water. It is given to a few and that also in exchange for a bottle of liquor.”

A severe drought in 1979 killed the unirrigated maize crop, while the irrigated crops survived. Tensions mounted. At a village meeting, a woman whose family lacked water said she would like to see the dam break and threatened sabotage (Mishra and Sarin 1987).

Equity becomes a prerequisite

There was only one solution: make sure everyone got a share of the water. In early 1980, a meeting of village households was called in Sukhomajri to resolve this issue. After some discussion, the villagers decided that all families would get an equal share of water, regardless of

where they were situated or how much land they had. The villagers established a water users' association to maintain the dams and distribute the water. Each family was represented in the association. Water was sold to each household at a nominal charge to meet maintenance costs. Pipes were laid to distribute the water throughout. Under the rules of the association, a member whose cattle were found grazing in the watershed stood to lose his or her right to water. Households with little or no land could make use of their entitlement by sharecropping or by selling their water to others. These arrangements ensured that each family had a vested interest in protecting the watershed.

Cooperation was immediate. The village did not have to build a wall or a trench to protect the vast catchment area. As crop yields improved, people sold their goats and started feeding their buffaloes in stalls. The goat population decreased from 206 in 1977 to only 32 by 1983 (Mittal, Agnihotri, and Madhukar 1983).

The water users' association, later renamed the Hill Resource Management Society, was critical to the extraordinary turnaround in Sukhomajri. At first, every head of household in the village was a member of the society. A decade later, in the interest of a voice for women, the membership expanded to include all adult residents, and the bylaws were amended to require at least two women on the managing committee (Sarin 1996).

The village assembly was given power to recall any member of the managing committee by a majority vote. This crucial clause put power in the hands of the majority and ensured participatory democracy.

The society provided a forum for the villagers to discuss problems, manage the local environment, and ensure discipline among members. The society made sure that no household allowed its animals to graze in the watershed. In return, it ensured a fair distribution of water, wood, and grass.

The forest

Providing water to the village was the first critical step in regenerating the environment around Sukhomajri. The second was to give villagers some control over forest land in the area. India's forests, owned by the government, make up 22 per cent of the land in the country. They are an important source of grass and wood. Villagers have limited rights to these areas. Grazing or collecting fodder and firewood is illegal but widespread, as villagers generally have no stake in the sustainable management of the lands.

For every hectare of cultivated land, Sukhomajri had limited rights over about five hectares of nearby forest land. The forest department would auction the right to cut grass to a contractor. The contractor would then sell grass to villagers during the November-to-June cutting season.

As the condition of the watershed improved, so did the condition of the forest, and residents thought they were entitled to some of the benefits. In 1985, after a protracted struggle, the forest department agreed to give joint grass-cutting rights to Sukhomajri and the neighboring village of Dhamala. The village societies would pay a royalty based on the average return that the land had produced for the forest department in previous years (Mishra and Sarin 1987). The village would in turn charge individuals a seasonal fee to cut grass. Now the village had a stake in improving the forest.

The village set a charge of 100 Rupees (equivalent, at the time, to roughly US $8)[1] to those who migrated for work and Rs. 150 ($12) to villagers who worked in the village. Widows and families facing hardships were not charged at all. In the first year alone, the village earned a net profit of more than Rs. 5,000 ($400), double the royalty it paid to the forest department (Mishra and Sarin). And instead of paying fees to a contractor, the villagers paid fees to their own society, which used the proceeds to generate more resources for the community. The village was able to plant more grass on the catchment, providing for more fodder and in turn more milk. This "cyclic development" of resources, as P.R. Mishra calls it, could continue to build the natural resource base of the village.

One of the most notable gains to the village came with new rights over a particular type of grass known as bhabbar. This grass, which grows in the forested watershed, is extremely fibrous and is widely used for making ropes and paper. As the environment improved, the growth of this grass increased manifold. In 1986, after a great deal of pressure, the village societies of Sukhomajri and Dhamala won rights from the forest department to harvest bhabbar grass in return for a royalty. The society in Sukhomajri raised the money for the royalty through an informal loan, then repaid it by hiring a subcontractor in the first year. The following year, villagers harvested 150 tons of bhabbar and reaped the profits directly.

To date, villagers still lack the right to harvest the most valuable asset that the forest supplies: trees. Among the most prized variety is the khair tree. Harvested at sustainable levels, these trees could generate proceeds of about Rs. 30 million ($700,000 at the current exchange rate) a year (Dhar 1997). The income could be even greater if the village were to set up an enterprise using the trees to make a condiment called *katha*.

Economic impact

The economy of Sukhomajri has made extraordinary gains since environmental reforms began in the 1970s. Crop yields went up. Grass and tree fodder from the forest have soared, fueling milk

[1] We have calculated each U.S. dollar figure based on the exchange rate in the year for which the corresponding Rupee amount is specified. The value of the Rupee has fallen steadily against the dollar over the past 25 years. In the late 1970s, 10 Rupees equalled one dollar. By 1999, 43 Rupees equalled one dollar. In covering a period of several years, we have calculated the average exchange rate for that period.

production. Brick and cement have replaced thatch and mud for houses, and most homes boast televisions, radios, electric fans, and sewing machines. "Who could imagine that televisions, tractors, and bicycles could be had for mere grass and water?" asks a villager. Annual household income has increased considerably, and the village has turned from an importer to an exporter of food.

A pooling of public, private, and community investment and effort has produced, according to one analysis, an annual internal rate of return of the order of 19 per cent (Chopra, Kadekodi and Murthy 1990). One of the most impressive results has been the transformation of Sukhna lake: the flow of sediment into the lake has dropped by more than 90%. The government now saves Rs. 7.65 million ($200,000) each year in dredging and other costs. The villagers have received no compensation for this 'positive externality.'

Progress in Sukhomajri

The village of Sukhomajri has seen the following improvements in its economy since it undertook environmental reforms in the mid-1970s.

- **Crops:** The yield rates of wheat and maize, the two main staples, increased by more than 50 per cent between 1977 and 1986.
- **Grass:** Grass production rose 75-fold, from 40 kg per hectare in 1976 to 3 metric tons per hectare in 1992.
- **Milk:** With more fodder available from the forest, villagers have shifted their livestock from goats to buffalo. The number of goats dropped from 246 to 10 from 1977 to 1986, while the number of buffaloes rose from 79 to 291. As a result, daily milk production rose from 334 liters to 579 liters.
- **Trees:** In the watershed, the number of trees increased almost 100 times, from 13 per hectare to 1,292 per hectare, between 1976 and 1992.

The village at a crossroads

Despite this great transformation, Sukhomajri stands in a precarious position today. As the land generates more wealth, all of the parties have a growing stake in obtaining their share. The village has regenerated the forest, but the government has refused to give more than 25 per cent of timber proceeds to the community. Meanwhile, the neighboring town of Dhamala has sought to expand its rights to forest resources.
Sukhomajri has been in protracted struggles with both the forest department and Dhamala.

At the outset, Dhamala and Sukhomajri shared the forest resources. But their interests were not the same. As a village of animal herders, Sukhomajri relied heavily on grass for fodder. Dhamala, on the other hand, is a village of mostly landowners, who would rather sell bhabbar grass to paper mills. In the early 1990s, conflict between the settlements erupted. Villagers in Dhamala alleged that the bhabbar grass was starting to decline because the villagers of Sukhomajri were using the first flush for fodder.

Before any officials were able to confirm the claim, the forest department banned the cutting of grass for fodder (Mahapatra 1998). The move was a clear statement in favor of the money economy over the subsistence economy, the gross domestic product over the gross nature product. Villagers accepted the ban but suffered from it. "We are forced to give our animals dry fodder even in the monsoon months," says Piari Devi of the village. Left with no option, she grazes her buffaloes 7 kilometers away from Sukhomajri.

Dhamala is an upper-caste village and so has greater access to the elitist forest department. A non-governmental institution called the Tata Energy Research Institute (TERI), based in Delhi, has a project to assist the forest department in promoting community involvement in watershed management. Yet TERI has ignored proposals from the Sukhomajri community to resolve differences with Dhamala. TERI and the forest department have imposed their own policy. The villagers of Sukhomajri are today so fed up that one of their leaders publicly threatened to burn down the forest.

Conflict between the towns escalated in 1995 when the forest department divided the land between the two villages. The villagers of Sukhomajri felt cheated and argued that Dhamala got the portion where most of the grass grows. Dhamala did enjoy higher grass sales in 1997-98.

On top of the tensions with Dhamala, Sukhomajri is facing other difficulties with the forest department. As sales of bhabbar grass have soared, the government has moved to take a huge share of the profit. In the past, when the forest department leased the land to paper mill contractors, the contractors paid minimal fees. When the village society in Sukhomajri first took over the cutting rights in 1985, the charges were similar. In 1988, with the land much improved and bhabbar production much higher, the department decided to increase its fees by 7.5% a year.

Recently, however, the government has moved to take a much larger portion of the grass profits. Under the current scheme, in place since 1997, the village society must pay not only

lease fees but also income and sales taxes, then turn over 25% of after-tax profits. Another 40% of the balance goes into two accounts designed to promote development of the village and forest (see Table 1). But forest officials concede that they have not yet charted out how they will use the village development fund and so have yet to spend any of it. After all is said and done, less than half of the income is left for distribution to the villagers (Mahapatra 1998).

It is not clear whether the village of Sukhomajri and its enterprising people will survive the repercussions of their own success. All depends on whether they will have the power to determine their own future.

Table 1: The "Benefit-Sharing" Formula of Government

	Rupees (*thousands*)	U.S. Dollars
Total bhabbar sales 1997-98	95.0	2,405
Less lease fees	- 21.6	- 550
Net income	73.4	1,860
Less income and sales tax (24.1% of net)	- 5.2	- 133
After-tax income	68.1	1,725
Less government share (25%)	- 17.2	- 435
Balance (75%)	51.7	1,310
Less village welfare fund (10%)	- 5.2	- 130
Less forest development fund (30%)	- 15.6	- 390
Distribution to villagers of Sukhomajri	31.0	790

Source: "Sukhomajri: Development Model." In *State of India's Environment 1999: Citizens' Fifth Report*. New Delhi: Centre for Science and Environment.

Case 2: Marshaling Government Resources in Ralegan

The village of Ralegan Siddhi, in Maharashtra state, is a model for rural development nationwide. Ralegan lies in an area so prone to drought that in the past villagers could not rely on any one crop to succeed (Mahapatra 1997). Irrigation facilities were minimal, covering about 50 hectares of land, and the crop yield averaged barely 1 ton per hectare. With poor soil and erratic rainfall, the people produced only 30% of the food that they needed to subsist. Some 15 to 20 per cent of the population had enough to eat only one meal a day. Most men migrated seasonally to look for work. The village was in the grip of poverty, moneylenders, and country-made liquor (Hazare 1997).

Change began with one inspired individual. It took off when the village figured out how to take advantage of government programs in a way that other communities rarely do.

The story begins in 1975, when Krishna Bhaurao Hazare, a retired jeep driver from the Indian army, returned to his native village. In the 1965 war between India and Pakistan, his transport unit had been attacked by jets, and he was the lone survivor. Hazare considered this a virtual rebirth and decided to devote his new life to social work (Lokur undated).

Hazare began by rallying around the dilapidated temple village, damaged by people who would steal wood from the building to use as fuel in distilling liquor illegally. Hazare invested his own money in rehabilitating the temple. As his work proceeded, villagers took interest and offered donations. Then Hazare suggested that people donate timber from trees lying along disputed farm boundaries. Soon ten truckloads of timber landed at the site, and the temple was revived.

Anna (meaning "big brother") Hazare, as he was soon called by the villagers, turned his focus next to farming. He made the rounds of government offices, gathering information about the various state-sponsored schemes available for rural development. Hazare then decided to start with watershed development.

Ecological regeneration

The basic principle of watershed management in semi-arid regions is to conserve both soil and water by planting trees and building water conservation structures. The entire watershed, from ridge to valley, should be treated so that every drop of rainwater either percolates into the soil or drains off into a water reservoir.

Hazare organized the villagers to build check dams, and water levels in the village wells soon began to rise. The village solicited and received funds from the district council to rebuild the foundation of a faulty percolation tank that the government had installed a few years earlier. Levels rose in the seven wells downstream. "It was the first time that during summer Ralegan saw a well with water," says a villager named Nirmala (Mahapatra 1997). With the construction of storage ponds, reservoirs, and gully plugs, the groundwater table rose further.

At the same time, the village planted 300,000 to 400,000 trees in and around the village, using a government forestry program that offered free saplings and money for labor to plant (Chopra and Rao 1996). With more irrigation water available, land that once lay fallow came under cultivation, and the total area under farming increased from 630 hectares to 950 hectares. Yields of millet, sorghum, and onions increased substantially.

Hazare encouraged the villagers to regard water as a community resource rather than an individual possession, and to manage the supply judiciously. The villagers formed a co-operative to oversee the wells and distribute water equitably. A farmer does not get a second round of irrigation until all families have had their first. Though there are no formal provisions for landless villagers who cannot use their share of the water, farmers are encouraged to compensate those without land.

Hazare led the settlement in establishing a village assembly, or *gram sabha*, to oversee all community decisions. The assembly persuaded all landholders to refrain from cultivating water-intensive crops, such as sugarcane. With a sustainable supply of water and a fair distribution of

it, farmers can now reliably grow two to three crops a year, and some of the bounty is exported all the way to Dubai.

Institutional dimensions

As in Sukhomajri, ecological regeneration has gone hand in hand with equality and participatory democracy. To ensure cooperation from the whole community, the village developed all of its four watersheds at the same time.

The assembly approves all initiatives to protect the watershed, and the elected village council, or *gram panchayat*, carries them out. The assembly also oversees a range of registered societies working on specific concerns. These societies include one for education, one for youth culture and social activities, and one for the welfare needs of women. A society providing technical assistance to farmers dispenses advice about fertilizers and seeds, organic practices, and getting financial help. A dairy society provides comparable advice about the dairy business. Before taking on any new projects, these societies must bring their proposals and cost estimates before the village assembly. Approval must be unanimous. Thus, the assembly is a tremendous social force.

As the village has prospered and people have come to enjoy a surplus, women have joined together to help one another financially. There are seven self-help groups, with 20 members each, who contribute Rs. 25 (60 cents) to Rs. 100 ($2.40) monthly toward a fund that now totals Rs. 200,000 ($4,800). Women can obtain loans from the fund at 2% interest to start a business or attend to some other need.

Ralegan has thrived with a combination of voluntary labor from residents, money from government rural development programs, and more recently, bank loans. By the 1993-94 fiscal year, the village had invested a total of Rs. 7.5 million ($380,000) in development. Nearly half of this figure represents the labor of the villagers.

Environment and jobs

In the mid-1980s, amid growing concern for the environment, the government of India sought to link its rural employment programs to ecological regeneration. The main thrust of the initiative was to put the rural poor to work on state projects that would help to promote land and water conservation. The state began providing jobs not just to build roads and schools, but also to plant trees, construct water percolation tanks, and complete other environmental projects.

Despite good intentions, however, the effort to link jobs with environmental protection has largely failed. The main reason is that villages have not been given enough stake in building and maintaining natural resources for the long haul. The villagers lack strong community institutions and legal rights to manage their assets. Thus new ponds are created to harvest water, but they continue to have degraded catchments. Earthen dams are built for soil and water conservation,

but they are of poor quality. In sum, the government generates work, but the work is ultimately unproductive.

Ralegan Siddhi turned the state employment programs on their head. Rather than build government assets, the village seized an opportunity to build community assets; that is they contributed free labour and shared the cost with government. The free labour was contributed by the rich and poor – with each individual contributing one day of free labor every 15 days. In addition, poor villagers were employed to work on these community projects using government funds. With each new project, the assembly gauges how much labor will be required, and with the contribution of voluntary labor it is able to bring down the cost of each project. The villagers identify themselves with these projects, and remain involved in their subsequent maintenance. Having established ownership over what would otherwise have been a state asset, they have reason to sustain it.

Looking at Ralegan, some have suggested that state employment programs be restructured to give communities greater power to control local resources. But government bureaucracies have maintained their hold, and widespread community control remains a dream. In Ralegan, villagers undertook most activities on government land in spite of government agencies, not because of them.

Ralegan received no special preference or extra allocation from the government. The village was unusual only in that it took full advantage of the numerous government programs that were available. The settlement received about Rs. 22 lakh ($180,000) through the watershed development program of the soil conservation department. The District Rural Development Agency gave funds to build houses for the homeless. Solar energy equipment was installed under a project to promote renewable energy. Because the villagers were eager to learn and were responsive, the Urja Gram Udyog Medha (Rural Energy Development Centre) installed solar panels for heating water. Solar cookers were also supplied at subsidized rates. The Council for Advancement of People's Action and Rural Technology provided funds for a windmill to pump water. The social forestry department also did some work.

Not all of these initiatives went smoothly from the start, but the village persisted to make them work. When the forest department failed in an effort to afforest one plot, the villagers and the agency discussed the problems and tried again, this time with good results. As noted earlier, a percolation tank built by the irrigation department in 1972 had failed to store water until the villagers repaired it. Because the villagers were so involved, they were able to create successes from numerous state schemes that would have otherwise produced limited results.

Economic impact

By Indian standards, Ralegan Siddhi is a rich village now. By the 1990s, not a single resident depended on drought relief programs. Incomes have risen to the point that more than a quarter of the residents now earn more than 500,000 rupees a year, or over $11,000 (Centre for

Science and Environment). The village is so prosperous today that a major bank has opened a branch there. Ralegan residents reportedly have private savings of Rs. 30 million, or about $700,000.

The progress in Ralegan is even more striking in light of the fact that only a million households in India earn more than one million rupees a year, and such people are considered "super rich" by the National Council of Applied Economic Research.) For a village that was once badly degraded both economically and environmentally, this is indeed a miracle.

Case 3: Alwar: Bringing Rivers Back to Life

Gopalpura is another poor, drought-stricken village, located at the base of the Aravali Hills in the Alwar region of Rajasthan state. The area is semi-arid, and over the years deforestation has left it devoid of vegetation. Most of the rain comes in four to five spurts of a few days each, with several dry days in between. All told, the region gets roughly 600 mm of rainfall a year (Agarwal undated), and surface water evaporates quickly in the heat. People in the region struggle to survive. There is hardly any industry, and most villagers follow the stream of migrants to cities in search of work.

In 1986, with help from a local voluntary agency, the people of Gopalpura built three earthen structures on their fields and grazing lands to collect monsoon rains, irrigate their fields, and increase percolation in the ground to recharge wells. These structures, called *johads,* are based on traditional techniques for capturing rainfall. After the water seeps into the soil, farmers can cultivate the land. (U.N. 1998). *Johads* can be built across a slope, and sometimes a series of them are constructed to hold the run-off from one structure to the next.

Gopalpura attracted a good deal of attention for its *johads,* and over the next decade, the voluntary agency, Tarun Bharat Sangh (TBS), helped to build almost 2,500 water conservation structures across some 500 villages in the region (U.N. 1998). TBS supplied certain materials and equipment, such as cement and diesel for tractors. Villagers were required to contribute labor and other materials. The total investment came to Rs. 15 crore ($3.5 million). Despite their extreme poverty, villagers contributed an astounding 74% of the total, in cash or in kind.

In each settlement, the village assembly met to plan for the *johad*. The villagers estimated which site would receive the most run-off, what size the structure should be, and who would benefit from it. The assembly set guidelines for distribution of water, management of the watershed, and repair of the structure. To protect the watershed, some villages instituted penalties for cutting trees or even breaking leaves.

Studies of some of the villages by engineers, social scientists, and journalists show that the projects have succeeded overall. There is no comprehensive study of the region, however, so there is not much information about variables that made some experiments work better than others.

One study looked at 36 of the villages and found a notable increase in groundwater as well as surface water in the region (Agarwal undated). The study, by G.D. Agarwal, former head of the civil engineering department at the Indian Institute of Technology, Kanpur, found that the groundwater table rose from 10 feet to 24.5 feet.

Agarwal found the structures to be quite cost-effective. The average cost was Rs. 0.95 (2.2 cents) per cubic meter of storage capacity. No state engineering organization would be able to build water harvesting structures at this price. They were durable, too. In 1995 and 1996, when intense rainfall washed away numerous structures designed by government engineers, each of the structures built by the villagers stood the test.

Water conservation has brought new life to rivers in the region. The Arvari and Ruparel, which flow from the Aravali Hills through hundreds of villages, once dried up each year after the monsoons. But the villagers built more than 250 structures along these rivers, and year by year, the flow lasted a little longer. Today, both rivers are perennial. Villagers talk about Arvari's revival as they would about the birth of a child. Hydrogeologists consider it to be a hydrological miracle.

The increase in water has brought improvements in agriculture. The Agarwal study found that wheat production doubled. The villagers still practice subsistence agriculture, but now they have enough to eat. Some villagers who migrated to cities for work are returning to till lands which lay fallow for decades.

Struggles with government agencies

As in the case studies presented earlier, the villagers in the Aravali Hills have had to fight with the government for control over natural resources. After considerable conflict, they have arrived at an unwritten understanding with state agencies to let them manage the environment.

When Tarun Bharat Sangh (TBS) built its first *johads* in the village of Gopalpura, the state irrigation department declared them illegal and asked that they be removed. Under the Rajasthan Drainage Act of 1956, water resources on private or government land, including groundwater, belong to the state. The irrigation agency first argued that the structures would reduce water downstream. Later the agency claimed that these structures could get washed away and flood villages. The next rains, ironically, washed away several official structures, while the *johads* built by the people endured. After a protracted resistance from the villagers, the administration finally backed down (Agarwal and Narain 1989).

When the villagers of Gopalpura planted trees in the catchment of their watershed, they received a notice that they would be fined, as the land legally belonged to the state revenue department. The agency eventually dropped the fine, though not before taking control of the land and distributing it to outside villagers, effectively destroying local control over the local watershed.

Similarly, the state intervened to control fishing rights in the Arvari River after its revival. In 1996, villagers in the riverside settlement of Hamirpura received notice that the state had given license to a contractor to fish in the river. The villagers insisted that the river was theirs, and that they were entitled to a say in its management. In December 1998, TBS organized a forum on the issue. Eminent jurists and former bureaucrats preached patience and encouraged the villagers to work with the government. But one of the authors of this paper, G.D. Agarwal, urged the people to fight for control over their environment. He suggested that villagers living along river form their own parliament.

The villagers took Agarwal's words to heart and in 1999, working with TBS, formed the *Arvari Sansad*, or Arvari Parliament, an association of all the villages along the river. The parliament adopted a constitution and formed two houses, one with a representative from each village, the second with a representative from each cluster of villages. They appointed a secretary and set rules and regulations for river management, including restrictions on the type of crops that could be grown in the river basin and limits on the installation of tube wells. These rules for water were critical to ensure equitable distribution of the water and prevent people from appropriating too much water to cultivate water-intensive crops, such as sugarcane.

On balance, villagers have scored some remarkable victories in controlling their environment. Still, the legal framework remains exclusionary, and nationwide policy changes are needed.

Case 4: Jhabua: When Government Learns

The transformation of Sukhomajri, Ralegan Siddhi, and villages along the Arvari are among a few scattered instances of the regeneration of rural ecosystems led by remarkable leaders and nongovernmental organizations. As a rule, government efforts in afforestation and watershed management have never been able to replicate such success, in most cases because they have been unwilling to hand over enough power to local communities.

One outstanding exception, however, is the state of Madhya Pradesh. There the government has promoted watershed management with extensive public participation. Trees are coming up in Jhabua, a district that looked like a moonscape 15 years ago. Dugwells are overflowing with water in an area once chronically prone to drought.

The change can be credited in large part to the chief minister of Madhya Pradesh, Digvijay Singh. Deeply inspired by the work of Krishna Bhaurao Hazare in Ralegan Siddhi, Singh decided to launch a similar program across the state after he became minister in 1993. He established the Rajiv Gandhi Watershed Development Mission (RGWDM), and drew on funds readily available from national programs for rural employment (Agarwal and Mahapatra 1999). Guidelines from the central government encourage state governments to use this money for watershed development, though few states actually do.

About 22% of Jhabua, covering 374 villages, has been brought under the watershed program. Across the state, the program has covered nearly 8,000 villages spread over 3.4 million hectares, or slightly more than one per cent of India's total land area. The agency has invested some Rs. 300 crore ($70 million) since it began the program in 1995-96 (Mahapatra 1999). The cost of afforesting one hectare has been less than Rs. 1,000 ($23.42), about one fifth the cost under other government initiatives.

The task in Jhabua was to prevent the water that falls on the hillslopes from running off, carrying away precious topsoil. Once retained, the water would percolate into the land and recharge the groundwater wells.

Water conservation measures have brought a range of economic and ecological benefits. A study of 18 microwatersheds in Jabhua found that the amount of land under irrigation doubled after four years (Agarwal and Mahapatra 1999). (A microwatershed covers about 500 to 1,000 hectares.) Natural streams increased their flow, and agricultural productivity increased.

More than 2 million trees were regenerated. The rate of regeneration far surpassed that of other lands that have been placed under forest protection programs without accompanying water conservation. More water increases soil moisture and thus plant growth. In turn, economic gains are made more quickly.

The biggest and earliest benefit to the local people has come from the rapid regeneration of grass, providing more fodder. Some estimates suggest there is five to six times as much grass as there was before the conservation program began. Most people in Jhabua are poor, and while some own land, most own unproductive livestock that scavenge on the hillsides. The increased productivity of the land gives families an incentive to protect the watershed.

Grain banks have brought increased food security, and fewer people are under pressure to migrate. Villagers have become less dependent on borrowing from moneylenders. Such debt dropped by 22% in the 18 microwatersheds studied.

Institutional dimensions

Jhabua shows what can happen when a government seriously starts working with the people. The state has created a whole new institutional framework, with several tiers, to ensure that policy is coordinated at the state level, that implementation is coordinated at the district level, and that democratic decisions are made at the village level. No institution can guarantee that all people will participate and benefit equally. But open, visible government at the local level creates opportunities for all.

Each district has a technical committee made up of district heads from various departments, including forest, irrigation, agriculture, industries, sericulture**,** village industry, and woman/child

welfare. This cooperation among agencies stands apart from most other states, where just one agency handles watershed development, and the focus is very narrow.

Each milli-watershed has a project officer supported by a group of technical executives and social workers. (A milli-watershed covers about 5,000 to 10,000 hectares, or about 10 times the area of a microwatershed.) This group assists village groups in designing and implementing conservation measures and acts as a link between the village groups and the project officer.

Each village comes up with its own watershed development plan. Villagers engage in an elaborate planning process that takes into account the welfare of the village as a whole as well as the preferences of various interest groups. The community conducts a rural appraisal in which villagers identify problems and solutions and consider what structures should be built. The plan is then approved by a district advisory committee. Funds for executing the program are transferred directly to the local watershed committee. By mid-1998, government spending in Jhabua district totalled Rs. 165 million ($3.9 million). Nearly three-fourths of the total was invested in watershed development works, and most of the money went for labor.

The local government is structured to provide for widespread participation by villagers in small groups. To begin with, each conservation structure is overseen by a user group. As the structures mainly benefit villagers with property, user groups basically represent the landed in the village. But environmental improvements may generate new jobs in the village, and the landless participate in self-help groups to promote employment. Finally, there are women's groups.

The village watershed committee consists of the chairpersons of the user groups, self-help groups, and women's groups. The state requires that at least a third of the members of the watershed committee be women. If there is a shortfall, the village assembly must nominate enough women to fulfil the proportional requirement.

The watershed committee falls under the supervision of the *gram sabha,* which monitors the progress of the watershed development plan, makes improvements, reviews accounts, resolves disputes, and takes action against officials and village groups when necessary.

Villagers have been encouraged to put aside part of their wages into three local funds. The first is a village fund to maintain water harvesting structures over the long term, as the government will withdraw after four years. The second is a fund for village welfare and investment. Third are women's funds for thrift and credit. By mid-1998, the maintenance funds had a combined total of Rs. 4.8 million ($110,000) across the district. The village welfare funds had saved a total of Rs. 4.2 million ($98,000). The women's groups had total deposits of Rs. 24.4 million ($570,000), or about 18 per cent of the project expenditure. Thus, environmental improvement has gone hand in hand with economic improvement (Agarwal and Mahapatra 1999).

Table 2: Village Institutions For Watershed Development In Jhabua

Type of group	*No. of institutions*	*No. of participants*	*Average no. of members per group*	*Average no. of groups per microwatershed*
Users	1,668	13,947	8	7
Self-help	1,256	9,699	8	5
Women	1,748	25,506	15	7

Source: Rajiv Gandhi Mission for Watershed Development. 1998. "Key Findings of Intermediate Assessment of Watershed Management Programmes in Jhabua District." Government of Madhya Pradesh.

Difficulties ahead

While the watershed development program of Madhya Pradesh has been a remarkable triumph, big challenges lie ahead. Now that the groundwater is being recharged, there is the danger that the more powerful villagers will begin to exploit the resource through private tube wells. Bureaucratic regulation of groundwater has not worked anywhere in India, and water tables are falling rapidly across the country. Even in Madhya Pradesh, officials realize that their success in Jhabua has brought them to a precarious place, where they must confront issues of inequity. In an unprecedented move toward community regulation of water management, state officials are proposing that local watershed committees be given powers to regulate withdrawal of water.

In addition, the government has not been able to match the success of Jhabua in other districts, for a variety of reasons. In some cases, the district leadership has failed to show enough interest and enterprise. In addition, some villages are intensely stratified. Jhabua is primarily a tribal society and thus relatively homogeneous.

Another problem is that even with a strong community spirit, local participation has not always been strong enough. If the *gram sabha* holds only a quick meeting and a watershed committee is set up through nominations, few people in the village are informed and involved, and the project suffers. Leadership at every level is critical, from the chief minister to the district collector to the local project implementation officer.

Nonetheless, the success of Jhabua offers great hope, showing that population growth does not make environmental degradation inevitable. With a limited, strategic role for state government and with democracy at the local level, sound environmental management is possible.

III. Conclusions

Environmental regeneration is not primarily about planting trees but about deepening democracy. In Sukhomajri, Ralegan Siddhi, Alwar, and Jhabua, natural assets began to accumulate only after communities were mobilized and given the power to manage their environment. In each case, the state or a non-governmental organization played a critical role by giving the community funds to invest and helping it find a way around restrictive national laws.

On a larger scale, regeneration could do a great deal to ease rural poverty. Urban poverty might be addressed as well to some degree, as villagers would face less pressure to migrate to the cities. The urban impact is hard to gauge, however. In each of the cases described, distress migration decreased. On the other hand, Ralegan Siddhi now loses residents who leave not out of desperation but out of a sense that better opportunities await in the towns. Though distress migration has been eliminated in Ralegan, total migration has actually increased (Chopra and Gulati 1997).

These examples remain few and scattered in large part because of a legal framework that denies villagers property rights over common lands. In three of the cases described above, the villages, strictly speaking, are managing the common property illegally. They have "appropriated" control, and after considerable tension and conflict with the state, the parties have reached an unwritten understanding. Even in Madhya Pradesh, where the state itself has initiated change, the various government agencies are cooperating under the direct orders of the state's chief minister, and the laws remain unchanged. Ecoregeneration on a large scale would require changes in national policy. The fight for such change will require extraordinary perseverance.

As the initiatives have progressed, new issues of property rights have arisen, demanding enormous institutional innovation. In Alwar and Madhya Pradesh, for example, watershed protection has made more water available, but now there is the risk of depleting the aquifer, as well as the danger of inequities in distribution between those who have electric or diesel pumps and those who do not. In Alwar, the villagers have set up a river parliament to contend with these issues. In Madhya Pradesh, the government is considering giving village watershed committees the right to set rules over groundwater usage.

In all these cases, progress has been possible because the communities created local assemblies that deliberate in the open and invite widespread participation. India's national laws, which favor representative democracy at the local level, have failed to foster more widespread progress. The most notable example of such failure is India's rural employment program, which pays people during droughts to work on public lands. The program has enormous potential. Environmental regeneration demands a heavy investment of labor, whether for reforestation, construction of water harvesting structures, or soil conservation. Ordinarily, impoverished people are not motivated to do this kind of work because the economic returns are not immediately apparent.

The government decided in the late 1980s to give rural employment funds directly to villages rather than routing the money through government functionaries. But the crucial error was that the village *panchayat*, not the *gram sabha*, was chosen to receive the money. Reports show that the *panchayats* have failed to ensure that the villagers are informed about the money or to consult with residents about how it is to be used (Agarwal and Narain 1991). With a different framework for village participation, the rural employment program could become a major tool for ecological regeneration. Here is a huge opportunity to rebuild natural capital.

As the resource base grows, so will the interests of the rich and the powerful in augmenting their share. Strengthening property rights and village institutions will become all the more critical. It has long been held that village institutions cannot protect the poor against powerful vested interests, and that the best solution is to strengthen outside agencies. Over the last 50-odd years of India's Independence, however, bureaucracies have themselves become a handmaiden of the rich and powerful. Their closed nature engenders corruption, leading only to more inequality.

The answer lies, again, in fostering democracy. The above case studies show that open and participatory village institutions, with clearly defined property rights, are in the best position to balance competing interests in the community. Of course, this does not mean that conflict will disappear or that all decisions will serve the interests of the poor. The best we can do is to provide an institutional and legal framework that allows the poor to fight for their rights.

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The Authors

Anil Agarwal is the director of the Centre for Science and Environment (CSE) in New Delhi, which he founded in 1980. One of India's first environmental non-governmental organizations, the CSE studies the relationship between the environment and development, and seeks to foster public consciousness about the need for sustainable development. Anil Agarwal has also chaired the world's largest network of environmental NGOs, the Environment Liaison Centre, based in Nairobi, and he is currently a member of the World Water Commission. He has won numerous national and international awards, including the prestigious Padma Bhushan Award bestowed by the President of India, and holds several honorary positions in governmental and non-governmental bodies.

Sunita Narain is the deputy director of the Centre for Science and Environment. Her research interests range from global issues of climate change to local issues of forest management and water resource management. In 1991 she co-authored with Anil Agarwal the CSE publication *Global Warming in an Unequal World: A Case of Environmental Colonialism.* In 1992 she co-authored *Towards a Green World: Should Environmental Management Be Built on Legal Conventions or Human Rights?* In 1997, she co-authored *Dying Wisdom: The Rise, Fall and Potential of India's Water Harvesting Systems.* An active participant in national and international civil society, she serves on the boards of several non-governmental organisations and on government committees.

The Natural Assets Project

The Natural Assets Project, based at the Political Economy Research Institute of the University of Massachusetts, Amherst, is a collaborative initiative launched with support from the Ford Foundation. The project aims to promote critical analysis and discussion of the potential for building natural assets - individual and social wealth based on natural resources and ecosystem services - to advance the goals of poverty reduction, environmental protection, and environmental justice.